

PCT



INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference 0514306	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US 03/07631	International filing date (day/month/year) 12.03.2003	Priority date (day/month/year) 12.03.2002
International Patent Classification (IPC) or both national classification and IPC B01D53/64		
Applicant BATTELLE MEMORIAL INSTITUTE et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.
- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☒ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 08.10.2003	Date of completion of this report 15.07.2004
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/07631**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-18 as originally filed

Claims, Numbers

1-10 as originally filed

Drawings, Sheets

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.
☐ paid additional fees.
☐ paid additional fees under protest.
☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☒ not complied with for the following reasons:

see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
☒ the parts relating to claims Nos. 1-5,7-9 .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3,7,8
	No: Claims	1,2,4,5,9
Inventive step (IS)	Yes: Claims	-
	No: Claims	1-5,7-9
Industrial applicability (IA)	Yes: Claims	1-5,7-9
	No: Claims	-

2. Citations and explanations

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see separate sheet

Re Item IV

Lack of unity of invention

Four different possible inventions are defined in the claims:

1. The first subject-matter defined in claim 1 is a process for removing heavy metals from a gas by contacting said gas with bauxite or modified bauxite (cf claims 1, 3-5, 7-9 all partially).
2. A second subject-matter defined in claim 1 is a process for removing heavy metals from water by contacting said water with bauxite or modified bauxite (cf claims 1, 3, 6-9 all partially).
3. A third subject-matter defined in claim 1 is a process for removing heavy metals from soil by contacting said soil with bauxite or modified bauxite (cf claims 1, 3, 6-9 all partially).
4. Process for removing or inactivating microorganisms in an emission or in the environment by contacting the microorganism with a mineral selected from bauxite, copper ores and mixtures thereof (cf claim 10).

In claim 1 three alternatives are considered (gas, water or soil). The general common concept is to contact polluted gas, water or soil with bauxite or modified bauxite in order to remove heavy metals (pollutants).

Claim 2 having a broader scope of protection than claim 1, the objections under Art. 33(2) PCT and Art. 33(3) PCT raised against the subject-matter of claim 1 also apply to the subject-matter of claim 2. The first invention is thus limited to claims 1-5 and 7-9 only for the case of gas treatment.

Documents found during search (cf item V) clearly show that the first subject-matter (relating to gas treatment) is not new (Art. 33(2) PCT) and thus not inventive (Art. 33(3) PCT). It should also be noted that the document US-A-6,030,537 cited in the application appears to be novelty destroying (Art. 33(2) PCT) for the process of claim 1 relating to water treatment. US-A-5,490,907, e.g., appears to be novelty destroying (Art. 33(2) PCT) for the process of claim 1 relating to soil treatment. Similarly US-A-2001/042719 seems to be novelty destroying (Art. 33(2) PCT) for the process of claim 10. Hence, there can be no common inventive concept between the four processes defined in the present set of claims.

The applicants not having paid additional fees as requested, only the first invention has been examined as far as novelty, inventive step and industrial applicability are concerned.

Moreover, the application states that sulfur is an essential ingredient for removing heavy metals from gases, whereas it is not for removing heavy metals from water or soil. There seems to be also a difference between the alternatives of claim 1 as far as essential features are concerned (Art. 6 PCT). Similarly, the processes of claim 1 and that of claim 10 seem to have different essential features. In claim 1 the sorbent material has to be bauxite or modified bauxite, whereas in claim 10 the sorbent can also be copper ores, i.e. free of bauxite.

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1.1 DE-A-19745191 (D1) discloses a process for treating i.a. gas containing heavy metals (col. 1, ll. 3-11) by the step of contacting the heavy metal containing gas with bauxite (col. 2, ll. 15-17; claim 1).

D1 appears to be novelty destroying for the subject-matter of claim 1 (Art. 33(2) PCT).

- 1.2 The process of modifying bauxite as defined in claim 3 should be known from US-A-2.391.116, cf col. 1, line 49, to col. 2, line 7, D2 also using bauxite for treating gases (col.1, ll. 21-22). The process of claim 3 does not seem to involve an inventive step (Art. 33(3)PCT). In D2 the heating is performed at temperatures as low as 400°F, corresponding to 204,4°C, i.e below 300°C as mentioned in present claim 3. Also GB-A-1.378.451 (D3) teaches to activate bauxite by heating at temperatures less than 325°C (cf page 1, ll. 51-55) in order to obtain a greater surface area.

Moreover, D1 teaches to prepare the sorbent material by heating at temperatures lying within the range of claim 3 (cf col. 2, ll. 24-29). This passage of D1 is also novelty destroying for the subject-matter of claims 4 and 5 (Art. 33(2) PCT).

The sorbent of D1 is also said to be suitable for using for dry sorption processes (col. 3, ll. 43-45). Thus it would be an obvious possibility for the skilled person to secure the sorbent of D1 to a permeable fabric, the latter being either in vertical or horizontal position. No inventive step can be seen in the additional technical features of claim 7 and 8.

D1 also foresees to mix the sorbent material with the gas to be treated (col.3, ll. 37-42). The process of claim 1 is not new over D1 (Art. 33(2) PCT).

2. DE-A-19936930 (D4) relates to a process for removing mercury from gases from flue gases. Bauxite is mixed with sulphur and added to the flue gases in order to capture mercury (cf claims 1 and 3). Thus D4 should be novelty destroying for claims 1,4,5,9 (Art. 33(2) PCT).

US-A-5.245.106 (D5) also concerns a process for eliminating mercury and/or arsenic from gases by using as a sorbent material containing copper sulfide (cf claim 1 of D5) mixed with i.a. bauxite (col.2, ll. 17-21). D5 further teaches to prepare the sorbent material by heating at temperatures below 300°C, see e.g. col. 5, ll. 15-20).

3. As already mentioned under Item IV, the objections of lack of novelty (Art. 33(2) PCT) and inventive step (Art. 33(3) PCT) raised against the subject-matter of claim 1 also apply to the process of claim 2.